

PIKES PEAK RADIO AMATEUR ASSOCIATION (PPRAA)

Activities/Meetings

- The January HAM breakfast was at:
New Days Cafe
- The February 6th HAM breakfast will be at
Country Buffet, 801 N. Academy Blvd,
Colorado Springs
Join us anytime between
8:00-9:30 AM
All are warmly invited
- PPRAA Board Meeting
Mon, January 11th
- PPRAA Club Meeting,
Wednesday, January 11th
IHOP
5749 Stetson Hills Blvd
- 10 Meter/2 Meter net
Every Thursday 7:00 pm
28.390 MHz—USB
144.200 MHz-USB
- Megafest July 9th
Lewis Palmer HS
Monument, CO

Inside this issue:

Officers	2
Online Resources	
Monthly Activities	
Improve 2M HT ant.	3
Minutes: Board	4
-Minutes: Membership	5
-Two-day tech class	
-Scholarship	
Current Regulated	6
What would Wayne do?	7
Testing	8
Nat. Parks on the Air	9
Application Scholarship	10

Ø-BEAT

Megafest: July 9th, 2016

Volume 66 Issue 01

January 2016

The Most Radio-Active Mountain in Colorado

By Bob KØNR



KØNR Operating VHF on Mt Herman
(Photo: Ken Wyatt WA6TTY)

I've often said that Mount Herman (W0C/FR-063) is the most (ham) radio-active mountain in Colorado. Many of us have operated from that summit for VHF contests, QRP events and Summits On The Air (SOTA). Of course, I didn't have any data to back that claim...until now. A review of the cumulative SOTA activations in Colorado through Jan 1, 2016 shows these four summits as the most-activated SOTA peaks.

Summit	SOTA Designator	Number Of Activations
Mount Herman	W0C/FR-063	95
Pikes Peak	W0C/FR-004	53
Mount Evans	W0C/FR-003	33
Squaw Mountain	W0C/PR-082	31

All of these summits are relatively close to the large population centers in the state. Also, they are not that difficult to get to and some of them have roads that go to the top. Pikes and Evans are both 14ers but can be accessed via 2WD vehicles.

But what makes Mount Herman so special? It does not have a road to the summit — you definitely have to hike it, a little bit more than a mile one way with elevation gain of ~1000 feet.

What makes the difference for Herman is that it is in the backyard of the well-known radio ham, goat hiker and SOTA enthusiast, Steve WGØAT. Steve has personally activated the summit more

than 30 times AND he drags along mentors, encourages other radio hams to join him. Frank KØJQZ did 22 activations, some with Steve and many on his own. (Frank just achieved SOTA Mountain Goat status, activating enough summits to earn 1000 SOTA points.) Fortunately for me, Mt Herman is about 4 miles as the GPS flies from my house, so I have worked that summit 31 times (usually Steve or Frank and always on 2 meters).

I've also activated Mt Herman for SOTA three times, as described here: A Soggy Mount Herman SOTA Activation (<http://www.k0nr.com/wordpress/2013/09/a-soggy-mount-herman-sota-activation-w0fr-063/>), Mt Herman: SOTA (<http://www.k0nr.com/wordpress/2014/09/mt-herman-sota-plus-vhf/>) plus VHF Contest and Winter Assault on Mt Herman (<http://www.k0nr.com/wordpress/2015/12/winter-assault-on-mt-herman/>).

For one of Steve's fun videos that captures the first SOTA activation of Mt Herman, with his goat crew Peanut and Rooster (SK), follow this link:

https://youtu.be/Nr5B_lx9clY

Frank and Steve, thanks for all of the Q's from Mt Herman over the past years! See you on the air and on the trail.
73, Bob KØNR

Check out Bob's site <http://www.k0nr.com/wordpress/>

[Ed.] For more information about Steve, WGØAT, see: the January 2016 issue of QST page 80 for an article titled "Goata SOTA" for more information about Steve, WGØAT.





PPRAA Officers and Board of Directors

PPRAA Board of Directors consists of four elected officers, seven board members, as well as the past president (time limit dependent). The Ø-Beat editor is a board appointed position and is also a member of the board.

Officers include:

- ⇒ President
- ⇒ Vice-President
- ⇒ Secretary
- ⇒ Treasurer

To send board member's email, browse to the officers section of our website: <http://ppraa.org/about-ppraa/officers>

President	Raleigh Holcomb	N4HYF
Vide-President	Rich Milligan	ADØNP
Secretary	John Wishart	NGØI
Treasurer	Pam Scott	WØPRS
Board Member	Dan Martin	KDØSMP
Board Member	Glenn Brodt	N3ULW
Board Member	Frank Roger	KB3PDT
Board Member	Jim Rader	KDØNQM
Board Member	Jim Bishop	KDØKQL
Board Member	Virgil Yost	NØXRS
Board Member	Mike Anderson	WV7T
Ø-Beat Editor	Dan Scott	WØRO
Webmaster	Doug Nielsen	N7LEM

Online Resources

PPRAA Website

<http://ppraa.org>

The PPRAA website is the cornerstone for club related information, events, and technical information.

In addition you can register, pay dues, and submit donations. Donations to the PPRAA college scholarship fund are managed by FAR Scholarship Committee

Facebook / Google+

Follow activities as they unfold, or get reminders of upcoming events.

Links to both Facebook and Google+ social media sites can be found on the PPRAA.org.

Or from each social media site search on: Pikes Peak Radio Amateur Association.

PPRAA Forums

The PPRAA forums are intended to allow users to exchange ideas, ask and answer amateur radio related questions, and plan/discuss upcoming events.

This is a fantastic, but underutilized, tool. Check it out and register at:

PPRAA.Forumotion.net

Monthly Activities

Membership Meeting

Held the 2nd Wednesday of the month starting at 7:00.

IHOP
5749 Stetson Hills Blvd
(Just west of Powers Blvd)

NOTE: Many show up at 6 pm for kibitzing and grub.

Board Meeting

IHOP
5749 Stetson Hills Blvd
Colorado Springs, CO 80906

6:30pm—8:00pm
On the Monday preceding the membership meeting.

Board Meetings are open to all members.

Ham Breakfast

Location changes monthly: Check ppraa.org or table of contents, page I for the breakfast meeting location.

10 Meter/2 Meter Net

Every Thursday at 7pm
Starts on 28.390 USB then transitions to 2 Meter SSB at 144.200 USB.



Improving 2-Meter HT Performance in Pedestrian-Mobile Applications

For part 1 of "Improving 2-Meter HT Performance in Pedestrian-Mobile Applications", please see the December 2015 OBeat, page 3.

William McFadden, WD8RIF

Part 2

The $\frac{1}{2}$ - λ End-Fed Whip

Unlike the stock rubber duck or the $\frac{1}{4}$ - λ whip described above, the $\frac{1}{2}$ - λ end-fed whip is a "complete antenna". Because it operates independently of a ground-plane, the $\frac{1}{2}$ - λ end-fed is often the antenna chosen for applications when a good ground-plane isn't available such as on wooden or fiberglass boats, or on automobiles with fiberglass or plastic bodies. When used without a counterpoise, the $\frac{1}{2}$ - λ end-fed whip performs much like a $\frac{1}{4}$ - λ whip with counterpoise; this makes sense since both antennas are $\frac{1}{2}$ - λ antennas and will have similar radiation patterns. When used against a ground-plane or counterpoise, the $\frac{1}{2}$ - λ end-fed whip provides about 2dB gain over the $\frac{1}{4}$ - λ whip operating against a counterpoise. For 2-meters, a $\frac{1}{2}$ - λ end-fed whip is about 36" long. Commercially-produced $\frac{1}{2}$ - λ whips tend to have extendable radiating elements; when the whip is collapsed performance is about the same as with a rubber duck.

Because the $\frac{1}{2}$ - λ end-fed whip is a complete antenna, it's the best choice for remote-mounting when a ground-plane isn't available. For instance, the $\frac{1}{2}$ - λ end-fed whip can be hoisted into a tree or suction-cup mounted to a window and fed with small coax from the HT.

Directivity with the Counterpoise

An additional benefit of using wire counterpoise with a rubber duck, $\frac{1}{4}$ - λ whip, or $\frac{1}{2}$ - λ end-fed whip is that the resulting antenna can be made directional. Simply extending the wire counterpoise in the direction of the other station should markedly increase signal strength in that direction.

Don't Leave the HT on the Belt!

Regardless of the antenna chosen for use with an HT, it's important to keep in mind that the signal of an HT hanging on the operator's belt can be reduced in strength by as much as 20dB when compared to the same HT operated at face level. Additional improvement can be had by holding the HT at arm's-length above the head and speaking into a remote microphone.

Notes & Sources (updated 2015-12-10):

Build a Tiger Tail HT Counterpoise (W1CAR) <http://chadrudolph.ipower.com/projects/tigertail.htm>

HT Antenna Modification for Increased Performance! (KE4SKY) <http://www.hamuniverse.com/htantennamod.html>

Santa Clara County ARES/RACES – Emergency Operations and Your HT http://www.scc-ares-races.org/emergency_operations_and_ht.htm
High-Efficiency HT Antennas (K0NR) <http://www.k0nr.com/blog/2006/07/k0dk-high-efficiency-ht-antennas.html>

High Efficiency Antennas for Hand-Held Radios (K0DK), from QEX magazine <http://www.ked-wireless.com/documents/High%20Efficiency%20Antennas%20for%20HT's%20%20QEX.pdf>

About the author:

William Eric McFadden (Retired SMSGT USAF), WD8RIF, is an Extra Class licensee. Eric earned the Novice class license at fifteen years old in 1978 and quickly progressed through Technician, General, and Advanced license classes. In late 1980 he earned the Amateur Extra license.

Since 1995 he has been an avid CW operator when operating MF/HF and a QRP advocate. Eric is the president of the Athens County Amateur Radio Association (ACARA) and trustee of the ACARA's W8UKE/R 2-meter repeater.

Eric is a founding member of the Southeast Ohio Radio Adventure Team, a small group of hams who enjoy operating their rigs outdoors.

Eric has written many interesting articles which can be found on his web site: <http://home.frognet.net/~mcfadden/wd8rif/radio.htm>



PPRAA Board Meeting Minutes—7 December 2015

Present: Raleigh Holcomb, Jim Bishop, Jim Rader, Virgil Yost, Ed Corn, Rich Milligan, Doug Neilsen, John Wishart, Glenn Brodt, Frank Rogers, Pam & Dan Scott, Dennis Major

The meeting was called to order by President Raleigh at 6:40PM at the IHOP at Powers & Stetson Hills.

October minutes were approved as it will be published. (Zero Beat is not out yet.)

Silent Keys: Ralph Rohrig, K10NK

Treasurer's Report

Pam reported that we had \$13,003.89 in our accounts as of November 30, 2015.

Presentation

Ed Corn was presented with a plaque and gift card for all his hard work on the club station. Thanks, Ed!

Committee Reports

Club Station

Mike Anderson has received an electronic lock for the trailer. After its installation, club members will be provided with the combination after getting club station orientation instruction.

Hamcon

Doug noted that registration for the event is now open and you can make reservations at the Keystone Lodge.

National Parks On The Air 2016

Doug also reported on this ARRL activity coming up in 2016. We want to encourage participation in these activation events during the upcoming year.

Winter Field Day

We are hoping to do this activity the latter part of January 2016.

Scholarship - no report on the amount accumulated was available at this time.

VE Report

Dennis noted that a new VEC will be conducting the next session this coming weekend, 9AM at Rawhide Realty, for the next couple of sessions.

Around the Table

Ed Corn - implemented a low power (1W) mobile simplex repeater for use as a talk-in aid and on-site use around the club station.

Glen - wanted to thank Pam for her assistance in getting the club shirts distributed. If we want to order more shirts, we can order more at a discount.

Jim Rader - several prizes will be available for door prizes at the Christmas party.

Jim Bishop -

Pam - wanted to know if we had the Megafest prizes selected yet. (Not yet)

Christmas Party

This will be at the Country Buffet Restaurant on South Academy near the Citadel Mall, Dec 9.

Next Board meeting: Monday, 11 January 2015, 6:30PM at the IHOP at Powers & Stetson Hills.

The meeting was adjourned at 7:40 PM.

Respectfully submitted,
John Wishart
PPRAA Secretary
10 January 2015

PPRAA General Meeting Minutes—9 December 2015

This was a Christmas / Holiday party meeting.

There were plenty of PPRAA members, their families and friends. A good time was had by all!

Ham Radio Two-Day License Class

The Monument Tri-Lakes Amateur Radio Club, W0TLM will be holding their bi-annual Technician's class licensing class..

Registrations are proceeding well with the Tech License Class. There is still space available but the class normally fills up.

Time: Sat Feb 27 and
Sat Mar 5 (8 AM to 5 PM) 2016

Location: Black Forest Fire Station 1
(Black Forest, Colorado)

The Technician license is your gateway to the world-wide excitement of Amateur Radio ...
Earn your ham radio Technician class radio privileges.

Pass your FCC amateur radio license exam right in class on the second day

⇒ Multiple-choice exam, No Morse Code
Required

- ⇒ Live equipment demonstrations
- ⇒ Learn to operate on the ham bands, 10 Meters and higher
- ⇒ Learn to use the many VHF/UHF FM repeaters in Colorado
- ⇒ Find out how to participate in emergency communications

There is a non-refundable \$30 registration fee for the class (\$20 for students under 18).

In addition, students must have the required study guide:

HamRadioSchool.com Technician License Course

\$20.95

Advance registration is required (no later than one week before the first session, earlier is better, this class usually fills up weeks in advance!)

To register for the class, contact: Bob Witte KØNR
Email: bob@k0nr.com or Phone: 719 659-3727



PPRAA Scholarship Fund—Matching Funds

To me, one of the most important activities we do as PPRAA is awarding the \$1,000 scholarship.

The PPRAA scholarship is for a student in, or going into, a hard sciences or engineering related field. Another way to think of this, if the field of study requires a lot of math then this scholarship is one the student should apply for.

The applicant's application is weighted towards Amateur Radio licensees that are Colorado students and headed to Colorado colleges and universities. These are preferences, not requirements.

There is a matching fund for up to \$500 in cash donations. Please see the back cover of this 0-Beat for instruction on how to donate.





ISOTRON 20/15/10

ENJOY THE WORLD OF DX

Columnist Ralph Bilal, WDØEJA is the president of Bilal Company. Ralph has been a presenter at the PPRAA club meetings.

MAKING A SMALL CURRENT REGULATED POWER SUPPLY

By Ralph WDØEJA

Last article was about making a simple voltage regulated power supply. The device used are the LM78xx or LM79xx series device. An inexpensive component that is easy to make use of. The "xx" refers to the voltage desired.

This is good for a good clean constant voltage. However what if we want to regulate the current so it does not exceed a certain value?

This device will also do this.

For example, you may want to charge a battery, but do not want to exceed a current value. You may want to connect a string of LED's, all with the same current rating.

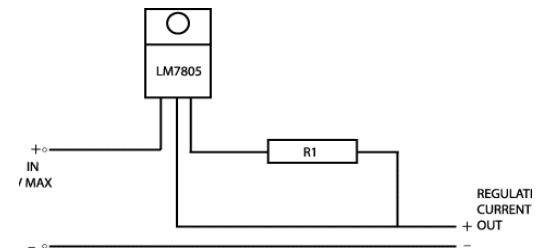
Below is a schematic of how to change the voltage regulator into a current regulator. Which regulator would you choose?

For a + current above ground, you can use any of the LM78 series. Voltage does not matter. For a - current in respect to ground, use the LM79 series.

Below is a LM78 device. R1 determines the value of the current limit. Using a LM7805 regulator with R1 at 250 ohms, the maximum current will be about 20 milliamps. This is ideal for a small LED. If you put more than one LED in series, the regulator will maintain 20 ma. It will adjust the voltage to deliver the 20 ma current and no more to light all the LED's.

For higher currents, reduce the size of R1. R1 does not need to be a high power resistor, 1/4 to 1/2 watt is fine.

When R1 equals 10 ohms on a LM7805, the current limit is about .5 amps. You can increase it, but the LM7805 has a maximum rating of 1.5 amps.



If the device is used as a current regulator, you can actually short the output leads together without damaging the device.

Some applications will require a definite voltage value. Then, the voltage regulator circuit is what you want. However, if voltage is not critical, but you would like to protect the circuit from damage, the current regulator works well.

73,
Ralph WDØEJA

JANUARY 2016

Ralph is the president of the Bilal Company. His website (<http://www.isotronantennas.com/>) has a couple links to interesting YouTubes as well as describing the full line of Isotron products..

What would Wayne (Green) do?

By Dan Romanchik, KB6NU

Wayne Green was a crackpot...but he was a great one.

For those of you who aren't as old as I am, Wayne Green, W2NSD, was not only the publisher of 73 Magazine, but also the founder of Byte and other PC magazines in the early days of personal computing. In 73, he would write these long, rambling editorials. Often, he would take the ARRL to task, criticizing what he thought to be some lunk-headed policy or another.

Just as often, he'd be encouraging hams to take up some new technology. He was, for example, one of the guys driving hams to set up repeater systems.

He would often exhort hams to get started in their own technology-related business. I remember one column where he urged hams to get involved in the home-security business. And, of course, when personal computers became popular, he wrote that hams should think about getting into that business. His reasoning was that our knowledge of electronics would stand us in good stead in those businesses.

Today, I think that he would be telling us to get more involved in with technologies like the Internet of Things, WiFi, or whatever other wireless technology is coming down the pike. "Wireless" is the key word here. These networking technologies are based on good, old radio, and who better to push these technologies forward than guys like us who understand radio.

This point was brought home to me last week as I was interviewing an executive of a wireless company for an article that I'm writing. He said to me that many of the companies he works with are taking a software-centric view to their wireless products. They simply use the reference designs provided by the wireless chip makers and expect those designs to work flawlessly in their products.

While they often do, he gave me an example where simply using the reference design was a colossal failure. In one case, he said, the company mounted

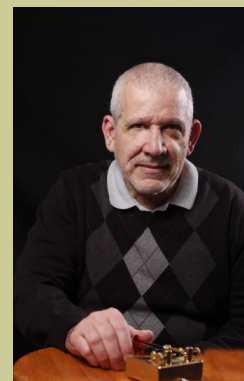
the board inside a metal enclosure. Since the antenna was part of the printed-circuit board, the enclosure acted like a shield, and of course, the device had little or no range.

He went on to say that he thought that there was a real shortage of experienced RF guys in the wireless industry. Does that sound like an opportunity to you? It does to me. So, I'm going to make like Wayne Green here and exhort all you guys to get out there and take advantage of it.

This is not only a business opportunity, but a way for amateur radio operators to fulfill a couple of the "purposes" of amateur radio, as set forth in Part 97.1 of the amateur radio regulations. Part 97.1(b) says that one of the purposes of the Amateur Radio Service is "Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art." According to Part 97.1(d), another purpose of the Amateur Radio Service is "Expansion of the existing reservoir within the amateur radio service of trained operators, technicians, and electronics experts."

Let's do it!

When he's not ruminating on the latest wireless technologies, KB6NU likes to make use of some vintage wireless technologies by working CW on the HF bands. He's also a prolific blogger (www.kb6nu.com) and the author of the "No Nonsense" amateur radio license study guides (www.kb6nu.com/study-guides). If you have a comment or a question, email him at cwgeek@kb6nu.com.



Dan Romanchik, KB6NU



VE Testing & Education—Colorado Springs (PPRAA)

Pikes Peak Radio Amateur Association (PPRAA)

When:

Feb, Apr, Jun, Aug, Oct, Dec
2nd Saturday at 9 AM

Location:

Rawhide Realty
7075 Campus Drive
Colorado Springs, CO 80920

Directions available at:

ppraa.org/ve-testing

or contact:

Dennis Major
VE@PPRAA.org

Mike Anderson, WV7T does personal and small group training for all license classes.

Mike also does Morse code training.

Mike can be reached at:
719-229-8610
vv7t@aol.com



VE Testing Woodland Park (MARC)

MOUNTAIN AMATEUR RADIO CLUB (MARC)

When:

Jan, Mar, May, Jul, Sep, Nov
1st Saturday at 10 AM

Location:

Woodland Park
Woodland Park Library-
Community Meeting RM
218 East Midland Avenue

Directions:

<http://www.nx0g.org/ve.html>

or contact

Wes Wilson (KØHBZ)
k0hbz@arrl.net
Call (719) 687-8758



Applicants will need the following items:

1. A valid PHOTO ID, driver's license preferred (if you do not have a valid photo ID, please call for alternative identification requirements).
 2. Your FRN or SOCIAL SECURITY NUMBER (now required – this includes children).
 3. Your CURRENT ORIGINAL amateur radio license (if any) and a PHOTOCOPY for the VE Team to keep.
 4. The CURRENT ORIGINAL CSCEs you have and a PHOTOCOPY for the VE Team to keep.
 5. Cash, Check or Money Order for \$15 (standard ARRL VE Fee). Checks and money orders should be made out to ARRL. This covers all exams you wish to take at this VE session.
- Teams, is to not allow same day retests on failed exams.
- PPRAA – Colorado Springs testing only:**
Anyone passing their Technician Class examination at a PPRAA test session will receive a free year's membership to the Pikes Peak Radio Amateur Association
- NOTE: PPRAA and MARC VE Team policy, as with many VE**

Activation National Parks on the Air (NPOTA) Rules (excerpt)



A section from ARRL.org:

1) Duration of National Parks on the Air

The ARRL National Parks on the Air (NPOTA) event runs in parallel with the National Park Service's centennial. The program runs from 0000 UTC January 1, 2016 through 2359 UTC December 31, 2016.

2) Goals of National Parks on the Air

- Promote the capabilities of Amateur Radio to the general public through operations at eligible NPS Administrative Units.
- Promote the NPS Centennial and the heritage of the National Park System through Amateur Radio.
- Encourage portable Amateur Radio operation from as many of the officially-listed National Park Service administrative units and recognized Affiliated Areas as possible.

4) Eligibility

The ARRL National Parks on the Air program is open to all licensed radio amateurs.

5) Administration

The ARRL National Parks on the Air Program will be administered only through Logbook of The World. No paper logs or QSLs will be allowed for award credit. Register for LoTW here.

6) NPOTA Units, QSOs, Bands and Modes

The complete list of NPOTA units and their alphanumeric designators is available at <https://npota.arrrl.org>.

Units eligible for the National Parks on the Air event are based on the NPS published list of officially recognized "NPS Administrative Units" and recognized "Affiliated Areas." As of December 26, 2015, there are 409 NPS Administrative Units and 72 recognized Affiliated Areas. Units not on this NPS list are ineligible for NPOTA credit.

QSOs made on all Amateur Radio bands are permitted, except for 60 Meters. Cross-band QSOs, QSOs made through repeaters, digipeaters, Echolink, or IRLP do not count. A specific exemption is granted for QSOs made through the recognized Amateur Radio satellites and through the International Space Station.

Only one QSO per NPS Administrative Unit will be credited for NPOTA award credit. There will be no tracking of QSOs by band or mode.

7) Certificates

Three awards certificates will be available:

- Activator Award: Awarded to any Amateur who makes a minimum of one accredited operation from an NPS Administrative Unit. The total number of qualified activations will be printed directly on the certificate.
- Chaser Award: Awarded to any Amateur who confirms QSOs with a minimum of one accredited operation from an NPS Administrative Unit. The total number of NPS units worked will be printed directly on the certificate.
- ... continued at <http://www.arrrl.org/npota-rules>
Check it out!



Throughout 2016, Amateur Radio will be helping the National Park Service celebrate their 100th anniversary. Hams from across the country will activate NPS units, promote the National Park Service and showcase Amateur Radio to the public.

Special offer \$5.00 on NPOTA supplies. Enter coupon code NPOTA online prior to checkout. Coupon code expires January 31st.
<http://ARRL.org/npota>

PIKES PEAK RADIO
AMATEUR
ASSOCIATION

Send membership application to:

Pikes Peak Radio Amateur
Association, Inc.
P.O. Box 16521
Colorado Springs, CO 80935

General Questions:
ppraa@ppraa.org

ØBeat:
zerobeat@ppraa.org



ppraa.org

Get Radio Active, get on the air!

Membership Application:

Date: ____ / ____ / ____ New Membership: Yes / No

Name: _____

Address: _____

City/State/Zip: _____

Call: _____ Class: ____ Phone # (____) _____

Email: _____

Are you a ARRL member: Yes / No

Additional Family Members:

Name1: _____ Call: _____ Class: ____ ARRL Member: Yes / No

Name2: _____ Call: _____ Class: ____ ARRL Member: Yes / No

Name3: _____ Call: _____ Class: ____ ARRL Member: Yes / No

____ \$15.00 Full Member

____ \$10.00 Full Member over 65

____ \$18.00 Family Membership

____ \$12.00 Family Membership over 65

\$____ Membership Amount

\$____ Scholarship Fund Donation

\$____ PPRAA General Fund Donation

\$____ Total

2015 Scholarship Fund

This last year the donations to PPRAA Scholarship Fund have been slipping.

The scholarship is for a hard science or math related field of study. Those fields of study are, or are similar to, Physics, Chemistry, Math, Electrical Engineering, Bio Engineering, etc.

There are many ways to make your tax deductible donation to this fund. Contributions may be made via:

⇒PPRAA website (<http://ppraa.org>)

⇒Part of your membership renewal,

⇒Club meetings and event.

⇒Directly to the fund at:
FAR Scholarship Committee
P.O. Box 911
Columbia, MD 21044

Make checks to:
PPRAA Scholarship

Ø- Beat Banner

Photo by Dan—WØRO.

This photograph one of the operating positions at the PPRAA club station.

The theme of the banner is Pikes Peak Region which include PPRAA activities.

If you would like to submit pictures for the Ø-Beat banner, please send them to:

zerobeat@ppraa.org

Please Include "[Ø-beat]" as part of the subject line.